Family Planning in Huntington’s Disease

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Presenter Disclosures

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The following personal financial relationships with commercial interests relevant to this presentation existed during the past 12 months:

No relationships to disclose or list
Overview

- Genetics of Huntington’s disease
- Family planning options
- Things to consider
Huntington’s Disease
Genetic Features

Autosomal Dominant Inheritance

- 50% risk to the children of an affected parent
- Males and females equally affected
Autosomal Dominant Inheritance
Huntington’s disease
Molecular Genetic Features

Trinucleotide repeat disorder
- CAG repeat expansion
- CAG-CAG-CAG-CAG

- Repeat count in a gene must exceed threshold to become disease causing
Huntington’s Disease
Molecular Genetic Features

The genetic test will reveal the CAG count of a person’s huntingtin genes

- Normal ≤ 26 alleles
- Intermediate = 27-39 repeats
- Disease causing ≥ 40 repeats
Huntington’s Disease
Family Planning Options

- Decide not to have children
- The at-risk parent is tested, have children only if the test is negative
- Natural conception, no testing during pregnancy
- Prenatal testing
- Pre-implantation genetic diagnosis
- Sperm/egg donation
- Adoption
Huntington’s Disease
Family Planning Options

Natural conception, no testing

- If the parent is a carrier of the gene:
  The pregnancy would have a 50% chance of inheriting the HD gene
- If the parent’s gene status is unknown:
  The pregnancy would be at 25% chance of inheriting the HD gene
Prenatal testing

Direct gene testing

- Test the baby’s genes for number of CAG repeats
- Highly accurate
- Can be done whether or not the at-risk parent has been tested
Family Planning Options
Prenatal Testing

Direct Gene Testing

- Chorionic villus sampling (CVS)
- Genetic Amniocentesis
Chorionic Villus Sampling (CVS)

- 10-12 weeks of pregnancy
- Up to a 1% risk of pregnancy complications
- Results: ~ 2–3 weeks
- 98% accurate
- Cost ~$2500
Genetic Amniocentesis

- After 15 weeks of pregnancy
- Up to a 0.5% risk for pregnancy complications
- Results: ~ 2-3 weeks
- >99% accurate
- Cost ~$2000
Prenatal testing
Direct gene testing

Things to consider

- What are you going to do with the information?
- Would abortion be an option if the pregnancy is affected?
- Can you accept the risk of miscarriage associated with the procedure?
- If your HD status is unknown and the pregnancy is affected, then your status will be disclosed.
Family Planning Options
Assisted Reproductive Technology

Pre-implantation Genetic Diagnosis (PGD)

- Tests the embryos for genetic disorders before transferring them into the uterus
- Is performed in combination with in-vitro fertilization
- Offers an alternative to traditional methods of prenatal diagnosis (CVS or genetic amniocentesis)
- Can be done whether or not the at-risk parent has been tested
Assisted Reproductive Technology
Pre-implantation Genetic Diagnosis (PGD)

The Process

- Ovarian Hyperstimulation
- Egg Retrieval
- Fertilization
- Pre-implantation Genetic Diagnosis (embryo biopsy and testing)
- Embryo Transfer
- Establishment of Pregnancy
In vitro fertilization
Assisted Reproductive Technology
Non-disclosing PGD

- Have biological children that have not inherited the HD gene while not revealing the status of the at-risk parent
- The couple may not be informed of certain details of their IVF cycle
Assisted Reproductive Technology Pre-implantation Genetic Diagnosis (PGD)

Advantages

- Opportunity to test an embryo for HD or other genetic condition prior to implantation
- Avoid abortion issue
- Increase likelihood for the baby to be disease-free (95-98%)
- Allows couples to have a biologic child without HD
Assisted Reproductive Technology
Pre-implantation Genetic Diagnosis (PGD)

Disadvantages

- **Cost:**
  - In vitro fertilization: $12,000 – 20,000
  - PGD: $3,500 - $5,000

- **Success rate of pregnancy**
  ~50% (under maternal age of 35)

- Increased chance for multiple gestation

- Prenatal testing still suggested for confirmation
Family Planning Options
Assisted Reproductive Technology (ART)

- Egg donation (at-risk or gene positive woman)
- Sperm donation (at-risk or gene positive man)

Can be done whether or not the at-risk parent has been tested
Assisted Reproductive Technology

Egg donation

- The donor undergoes ovarian hyperstimulation therapy to produce numerous eggs/cycle
- Eggs are retrieved and are fertilized with the man’s sperm
- The woman is on hormone therapy to prepare for a pregnancy
- The embryos are put into the woman’s womb
- Pregnancy is established
- The baby will be biologically related to it’s father
Assisted Reproductive Technology
Sperm donation

- May be done either through
  - intrauterine insemination
  - in conjunction with IVF

- May need to go through a number of cycles (5 – 10) before becoming pregnant

- The baby will be biologically related to it’s mother
Assisted Reproductive Technology
Sperm or egg donation

Advantages

- Eliminates the risk of HD
- Biological child to the unaffected parent
- Avoids abortion issue
Assisted Reproductive Technology

Sperm or egg donation

Disadvantages

- Uncertainty regarding donor’s family history
- In vitro fertilization required for egg donation
- Success rate: < 50% with donor eggs
  10 – 20% with donor sperm (each cycle)
- Cost
  - Egg Donation - $15,000 – 25,000 per cycle
  - Sperm donation/intrauterine insemination - $300 - $500/cycle (total $1,500 – 4,000)
Family Planning Options
Adoption

- International
  - Health history is considered
  - Cost $25,000 – 45,000
  - Take about 2 years to complete adoption

- Domestic
  - Health history is considered
  - Cost is ~$20,000
  - Time to complete adoption varies
Family Planning Options
Important Questions to Consider

- What is the goal of the family? Is the couple equally motivated?
- What decision will be made if the baby is determined to have a the HD causing gene?
- Why pursue prenatal diagnosis if abortion is not an option?
- How important is the promise of treatment or cure?
- Adequate family support available?
Family Planning Options
Genetic Counseling

- Opportunity to learn more about the family planning options that are available
- Chance to discuss in detail the pros and cons of each option
- Help clarify which decision may be best for you and your family
For More Information

- For more information on HD, genetic testing and to find an approved HD testing center:
  Huntington’s Disease Society of America  [www.hdsa.org](http://www.hdsa.org)

- To find a local genetic counselor:
  National Society of Genetic Counselors  [www.nsgc.org](http://www.nsgc.org)

- To learn more about assisted reproductive techniques including PGD, sperm and egg donation:
  American Society for Reproductive Medicine  [www.asrm.org](http://www.asrm.org)

- For more information about IVF, donor egg and sperm, PGD and to find providers:
  Infertility Resources for Consumers  [www.ihr.com](http://www.ihr.com)